

THE VETERINARY MAGAZINE

A JOURNAL FOR THE PRACTITIONER, AND FOR THE ADVANCEMENT
OF COMPARATIVE MEDICINE.

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THE VETERINARY MAGAZINE.

VOL. III.

DECEMBER, 1896.

NO. 12

BOVINE TUBERCULOSIS AS A FACTOR IN THE PRODUCTION OF HUMAN TUBERCULOSIS THROUGH THE USE OF MEAT AND MILK.*

BY D. H. BERGEY, M. D.

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Tuberculosis causes about 14 per cent of all deaths—or more than smallpox, diphtheria, scarlatina, typhoid fever, typhus fever, yellow fever, cerebro-spinal fever, Asiatic cholera, relapsing fever, leprosy, measles, and whooping-cough combined. The extremely high death-rate from tuberculosis should call forth all our dormant energies to prevent its spreading and to arrest its further progress. Preventive measures are of especial importance because of the insidious onset of the disease, and its relatively slow progress when once established, because it causes such prolonged suffering, entails such great expense to those suffering from it, and is so readily transmitted from the sick to the well. Tuberculosis is one of the most dreaded diseases which afflict the human race.

The bacillus tuberculosis is now considered by all the best authorities to be the real and active cause of tuberculosis, yet they all agree that, without doubt, the environment and the vital resistance of the body are important factors in facilitating or retarding the propagation of the disease. There can be no doubt that the nature of the soil and the condition of the biologic functions of our bodies will influence the results when

* Montgomery County Medical Society, Norristown, Pa., December 16, 1896.—*Medical News*, Jan. 23.

the germs of tuberculosis succeed in gaining an entrance. On the other hand there can also be no doubt that it is impossible to produce the disease tuberculosis in human or animal bodies without sowing the germ of the disease in such body, whatever the nature of the environment may be, or to what extent the vital resistance of the body has been reduced.

There is no longer any dispute as to the identity of the disease as it occurs in man and the domestic animals—excluding fowls. We have abundant experimental evidence that the disease is readily communicated from man to the lower animals, and that the lesions produced are identical with those observed in man.

Authorities differ as to the extent to which tuberculosis prevails amongst the domestic animals. It has been estimated that from 5 to 15 per cent of milch cows are tubercular. The prevalence of the disease amongst cattle varies greatly in different sections, being more prevalent in those sections in which the cattle are confined in close stables during the greater portion of the year.

The possibility of transmitting tuberculosis from the lower animals to man has long been recognized. The danger of contracting the disease through the consumption of the milk and meat of tubercular cattle has been known to the scientific world for more than a hundred years. The extent of the danger is today the principal controversial point. It is frequently contended by those who pretend to assume a conservative position that we lack sufficient positive data, experimental and physiologic, to warrant us in formulating definite conclusions on the subject. Happily, however, recent literature on the subject abounds in data accumulated by a host of scientific observers, whose competency is unquestioned, which show that the danger of infection through tubercular meat and milk is very great.

As the result of clinical observation a number of observers report instances of infection through the alimentary tract in animals by mixing tubercular sputum with the food. Reissmann¹ quotes Jacobs, Devillers, Leugler, Durieux, Demme, Bollinger, Lamallerec, Nocard, Johnne, Peters, Morro, Zschokke, and Eberlein who report instances of infection in this manner in heifers, cats, dogs, hens, and parrots as the result of taking human tubercular sputum with the food. He also quotes

Klebs, Goring, Zippelius, Lehnert, Kloss, Böttcher, Woodhead, Utz, Demme, Uffelman, Felizet, Martin, Ebstein, Hergard, Johne, Prümers, Gosse, Sonntag, McFadyean and Woodhead, Bang, and Lucas who report instances of infection in heifers, calves and pugs from milk, and also of swine feeding on the meat of highly tubercular heifers. Kolb, also reports three pigs fed on raw tuberculous meat which showed tubercular infection of the alimentary tract. Schmidt observed a number of cases of infection in chickens, especially of the liver, which had been fed on raw meat from a highly tubercular ox.

Reissmann states that the presence of tubercle bacilli in the walls of the blood-vessels, in the lumen of the vessels, and in thrombi, as well as in the vicinity of the vessels, has been demonstrated in a number of cases of advanced tuberculosis in cattle by Fütterer, that Rüttimeyer found bacilli in the blood of a case of acute general tuberculosis and in another case he found bacilli in the spleen; Sticker, in two cases, Ulacocis, in one case, of generalized human tuberculosis found bacilli in the blood taken from the tip of the finger; Meisels, and Lustig, also found bacilli in the blood; Heller also reports a similar result; Weigert, Nasse, Herxheimer, and Bergkammer found bacilli in the blood and lymph of cases of generalized and miliary tuberculosis. Confirmatory reports have also been made by Hanau, Bang, Hagemann, Sticker, Sacerdoti, Coutoui, Ehrlich, Guttmann, and others, indicating that there is danger of infection from meat of tubercular cattle even in the absence of lesions in those parts.

The report of the Royal Commission on Tuberculosis² is the most important communication on this subject of recent date. This report is based on (1), the experiments of Dr. Sidney Martin, who fed pigs, guinea pigs, and rabbits on meat and milk derived from tubercular animals though all tubercular lesions were first remarked. Of the animals thus fed, 36 per cent (15 out of 41) of the pigs became tubercular; of the guinea pigs, 16 per cent (24 out of 145); and of the rabbits, 15 per cent (2 out of 13). He also fed 1 pig, 8 guinea pigs, and 10 calves with material containing tubercular matter, each animal receiving only a single dose. Of these animals, the pig, 6 guinea pigs, and 8 calves became tubercular. The report is based on (2) the experiments of Dr. Sims Woodhead, who fed 7 pigs, 5 cats, and 76 guinea pigs on tuberculous

matter, all the pigs and cats and 50 of the guinea pigs became tubercular. Both of these investigators found that the milk of tubercular cows contained bacilli only when the udder was also diseased, and was only then capable of conveying the disease to the animals fed upon the disease, to the animals fed upon the milk, or inoculated with it. However, when the udder is diseased the milk possesses a most extraordinary virulence. They report that the udder may be diseased in the early stage of the disease, and when diseased the disease process spreads with great rapidity. At times the udder may also be diseased without presenting any definite signs in the earlier stage of the disease, becoming a very great danger to those using the milk. Both Dr. Martin and Dr. Woodhead insist that no tubercular animal of any kind should be allowed to remain in a dairy.

Dr. Woodhead experimented in roasting and boiling meat smeared with tubercular matter. He found that rolls of such meat of over three to four pounds in weight were not sterilized by the ordinary methods of cooking. He also experimented with tubercular milk heated to 80° C. (176° F.) for ten minutes, and found that guinea pigs fed on such milk became tubercular.

As the result of his experiments Dr. Martin was especially impressed with the danger of infecting the entire carcass of an animal in removing the diseased organs from it. Manifestly this danger is least in those cases in which the disease is distinctly localized in a single organ, but the danger is greatly increased when the disease is more generalized. He says that "one is driven to the conclusion that when meat is infective it commonly acquires its properties by being accidentally contaminated with tuberculous material during its removal from the carcass. This conclusion, it is evident, is one of great practical importance, bearing directly on the question of the condemnation of the meat of tuberculous cattle for human consumption. And it is evident, also, that infective properties of meat might vary with different series of experiments; * * * the result depends on the care taken in guarding against contamination more than on anything else."

Dr. E. C. Schroeder³ reports several series of experiments with milk for the detection of tuberculosis. In the first series of experiments guinea pigs were injected into the abdominal cavity with nineteen samples of milk from different dealers or dairies, only one of the samples proving to be tubercular. In

the second series of experiments guinea pigs were injected into the abdominal cavity with twelve samples of milk taken from cows that were known to be tubercular, only one of the animals succumbing to the disease.

Dr. E. O. Shakespeare⁴ in speaking of tuberculosis in relation to infectious milk says that "since tuberculosis of the human race has become better known, it has been found that in infants and young children, in some large cities, the mortality from some form of tuberculosis is far greater than has been generally believed, amounting, in some localities, to one-fifth of the deaths of the young. A significant fact in this connection is that it is most frequently some part of the digestive passages that becomes first affected in children."

Dr. Irving A. Watson⁵ cites the following observers on the question of transmission of tuberculosis through the milk of tubercular cows:

"Leonhardt reports the case of a healthy infant, of healthy parents, which was weaned and put on cow's milk. The child soon died of tuberculosis of the meninges, intestines and mesenteric glands.

"The cow which gave the milk was found to be tuberculous. Another child fed on the milk of the same cow died, at about the same time, from tubercular meningitis. Sontag reports the case of a six months' infant of healthy parents which at autopsy showed miliary tuberculosis of the meninges. It was fed with milk from a tuberculous cow. Hermsdorf gives three cases in which there was extensive intestinal tuberculosis, besides less general affection of other organs. One had taken uncooked milk from a tuberculous cow. Demme reports the case of a four months' infant, which at autopsy showed tuberculosis of the mesenteric glands. There was no tuberculosis in the family for two generations on either side.

"The milk came from a cow with general tuberculosis. Bollinger cites Stang's case of a boy of five years who sickened with ascites and enlarged glands in the abdomen. At autopsy the chief lesion was tuberculosis of the abdominal lymphatics, but there was also tuberculosis of the serous membranes and of the lungs. There was no tuberculosis in the family for two generations. The child had for years been in the habit of drinking milk warm from a cow, which growing thin before the boy died, was killed, and found to be tuberculous."

Dr. L. Emmett Holt⁶ reports on 1045 consecutive autopsies from the records of the New York Infant Asylum and the Babies' Hospital—ten per cent of which were found to be tubercular. He also cites 17 cases observed elsewhere—making 119 cases altogether. Of these children 57 were less than one year of age; 39, between one and two years; 32, between two and five years, and only 15 were over five years of age.

It is unnecessary to further multiply the citations of the results from the experimental investigation of the question under discussion, or the results of clinical and pathologic observations as to the direct transmission of the disease through the use of tubercular meat and milk.

The phase of the subject which gives rise to differences of opinion today, amongst medical men as well as the laity, is not whether the meat and milk of tubercular cows are dangerous, but at what stage of the disease do they become dangerous. It is evident, from the results of experiments upon animals, that in the earlier stages of the disease, while the disease process is still localized in a single organ, that the meat of such animals is not dangerous, and is claimed by some to be innocuous. It is also evident that, as long as the udder of a cow is not involved, the large majority of cows do not yield tubercular milk.

The different opinions on this phase of the subject explain, to a great extent at least, the differences in the laws and customs, in different countries, with regard to the use of the meat and milk of animals suffering from localized tuberculosis. This difference in the laws and customs of different countries is only in part explainable on these grounds. A further cause of the differences in these laws is also due to the fact that in some of these countries the laws have not been brought up to the level of our present day knowledge of the subject.

In the several German States the laws vary to a considerable extent. As a rule the meat is condemned when there is fever, when the animal is emaciated, when the disease has become generalized, and when there are nodules in the meat. In France, Italy, Belgium and Denmark the same general law also applies as in the German States, and when the disease is localized, and the diseased portion is easily removable the meat may be used. In Saxony and Mecklenburg the diseased meat must be divided into small pieces and sterilized at 100° C. for

half an hour before it is sold as food. In Saxony, Bavaria, and in Italy such meat can only be exposed for sale when distinctly marked with a declaration that it came from a tubercular animal, while in Denmark it is sold as second-class meat.

In searching the literature of the subject for expressions of opinion by eminent scientists on the question of the use of the meat and milk of tubercular cows I find that Drs. Martin and Woodhead, already quoted, are of the opinion that all diseased animals should be killed and the meat condemned. Dr. Deshayes⁷ says that "all animals infected with tuberculosis, even localized, should unalterably be rejected for human consumption."

Dr. Theobald Smith⁸ coincides with Nocard, whom he quotes, in saying that all highly tubercular animals should be condemned. Those having the disease in its incipient stage should be quarantined, fattened, and then sold only to the butcher. If they are found to be but slightly diseased, the meat may be exposed for sale after removal of the diseased portions.

Frequent visits to the abattoirs of Philadelphia convince me that the meat of cows with localized tuberculosis is allowed to be sold. When the disease is somewhat generalized I am informed the inspectors condemn the carcass and it is converted into fertilizer.

Many writers claim that it is merely a matter of sentiment whether we condemn the meat of animals in which the disease is localized. To me it is a matter of the greatest vital importance. When we consider the markedly lower mortality from tuberculosis among the Jews, it is evident that their greater immunity from tuberculosis must be traceable to their rigid meat inspection alone, because, as a rule, they do not live under the most favorable hygienic conditions. Their rigid system of meat inspection is generally known. They discard the entire carcass of every animal that shows signs of disease of the organs of the great body cavities. Such meat is then sold to ordinary consumers.

To guard against the dangers of infection through the use of tubercular meat and milk, we should urge the necessity of the thorough inspection of all cows kept for breeding purposes, or whose milk is offered for general consumption. All animals intended for use as meat should also be inspected, and those

showing a trace of the disease should be condemned as unfit for consumption. The most reliable and ready method known to us today, by means of which we can detect the disease, even in the incipient stage, is the tuberculin test. This test is now employed in many States, and in many of the foreign countries, and, if the tuberculin has been prepared by competent bacteriologists, it is without detrimental effects on healthy animals.

In the absence of positive knowledge as to the healthfulness of cattle whose meat and milk is intended for human food, it is of the utmost importance that all milk be heated to 180° F. for five minutes before it is used, and that our meat be thoroughly cooked in order to avoid the danger of infection through its use.

¹ Reissmann, Hygienische Rundschau, Berlin, 1896, No. 18, 19, 20 and 21.

² Report of the Royal Commission on Tuberculosis, London, 1895.

³ Schroeder, U. S. Department of Agriculture, Bureau of Animal Industry. Bulletin No. 7, Washington, D. C., 1894.

⁴ Shakespeare, Public Health Circulars, issued by the Philadelphia, Pa., Board of Health, No. 11, Philadelphia, Pa., 1893.

⁵ Watson, New Hampshire State Board of Health, 1892.

⁶ Holt, Med. News, Dec. 12, 1896, p. 656.

⁷ Deshayes, Revue de Hygiene, Dec., 1890, p. 1074.

⁸ Smith, Bureau of Animal Industry. Bulletin No. 7, Washington, D. C., 1894.

BACTERIOLOGY IN ITS RELATION TO VETERINARY SCIENCE.*

BY DR. RAVANEL.

Bacteriologist of the Pennsylvania Live Stock Sanitary Board.

While the results attained by Pasteur and Koch will probably always remain unsurpassed by future investigators in this branch of science, the veterinary profession has furnished a number of men whose work has been epoch-making, and who have added much that is most useful to our knowledge. Nocard, Leclainche, Chauveau, Strauss, Shütz, Bollinger, Kitt, Johnne, Railliet, Peroncito, Stockfleth, and many others, can

* Read before the Keystone Veterinary Association, December 8, 1896.

never be forgotten, while in the rank and file of veterinary practitioners there has always been a host of earnest and intelligent workers, who though they may not have succeeded in recording brilliant individual achievements, have done noble work, and have given most generous assistance to those who have made a special study of bacteriology.

It is peculiarly fitting, therefore, that veterinarians should take especial interest in the advancement of a science, which they have done so much to develop. Each year records new discoveries, and reveals possibilities not dreamed of less than a generation before. The field of preventive medicine has so far proven more productive to the veterinarian than it has to the physician. Quarantine laws based on bacteriology, have as wide a scope for the former as for the latter.

Time does not permit me to go into details, therefore I will only mention briefly the success which has attended preventive inoculation against *anthrax*, *rouget du porc*, *chicken cholera*, *raushbrand*. The inoculated substances are now known as "vaccines"—following the suggestion of Pasteur, who first succeeded in producing an artificial immunity by bacteriologic methods, and generously proposed the adoption of the general term "vaccines" in honor of Sir Edward Jenner.

Work along these lines is constantly going on in all parts of the world, and so favorable have the results been that we have reason to hope that in the near future efficient "vaccines" will be found against the great majority of diseases to which man and animals are susceptible. In addition to those just mentioned, we now have others for the prevention and cure of tetanus, diphtheria and streptococcus infection, and a certain degree of success has been attained even against tuberculosis. Though not strictly germane to my subject, the methods and results are so similar, that I may mention also the wonderful results obtained by Calmette and Fraser in the production of immunity against the serpent venom, and the immunizing properties of the blood serum of the immune animals, called *antivenin*.

These vaccines are produced by different methods; the present imperfect understanding we have of susceptibility and immunity makes it impossible as yet to have one uniform method of procedure. The nature of the disease also influences us to a certain extent. Thus, while tetanus kills by the

extremely virulent toxin formed by the germ, the germ itself never being found far beyond the site of inoculation, anthrax on the other hand seems to kill rather by its presence in veritable myriads (mechanically) than by any special poison produced. In the spleen, for instance, the anthrax bacilli are often so numerous as to be more apparent under the microscope than the tissues proper to the organ. The glomeruli of the kidney are so tightly packed that they frequently burst, and the rods pass into the first part of the tubules. Diphtheria, like tetanus, kills by means of the toxin formed, the germs only rarely being found distributed through the blood and internal organs.

For anthrax and diphtheria we have two distinct types of vaccination, while a third is practiced against rabies. The success in each has been most marked and abundant.

In anthrax, vaccines are obtained by cultivating the anthrax bacillus under conditions which decrease its virulence, and make it non-spore-bearing. The usual procedure is by cultivation at a temperature somewhat above that at which the germ grows best. According to the length of time to which it is subjected to this treatment, various degrees of virulence are obtained, and these modified cultures are called anthrax vaccines. Two are usually employed, the more attenuated first, followed by the stronger after a few days.

In diphtheria we produce a gradual immunity in an animal—the horse being the one usually selected—by subcutaneous injection of the strongest toxin we can produce by artificial culture of the bacillus, the injections being about eight days apart, commencing with one c. cm. and continuing usually until the dose reaches the enormous amount of 200 c. cm. During this time what we call *antitoxin* has been developed in the blood of the animal, and is contained in the serum. It has both therapeutic and prophylactic properties.

In anthrax and diphtheria the success attained has been truly wonderful; in tetanus, in which the plan outlined for diphtheria is usually followed, the success has not been great, but through no fault of the method. The chief cause of failure is that treatment is usually begun too late, for when tetanic symptoms have already shown themselves, the cell destruction has gone so far that, in the majority of instances, repair is impossible. Professor Roux, of the Pasteur Institute, lays great stress on

this point, and with Nocard advises prophylactic rather than therapeutic treatment.

The type of vaccination employed against rabies consists in producing a rapid immunity by successive inoculations of rabic virus, which has been attenuated by exposure to air and drying, commencing with a feebly virulent injection and ending with a strong one—the treatment being begun after inoculation with a supposedly virulent virus from the bite of a rabid animal.

A fourth type of preventive inoculation is seen in vaccination against smallpox; the occurrence of the mild disease, *vaccinia*, protecting against the allied, but virulent and fatal disease. Not being founded on bacteriologic methods, however, it need only be mentioned here *en passant*.

It would be most tempting to speculate on the possible achievements of the future, and to dwell longer on what has already been accomplished, but the object of this address is mainly to point out to you how the general practitioner may best assist the specialist in bacteriology in his work for their mutual benefit.

Through the efforts of Dr. Pearson, State Veterinarian of Pennsylvania, a bacteriologic laboratory has been established at the University of Pennsylvania by the State Live Stock Sanitary Board, and it is our wish and purpose to make the work of this laboratory a benefit to the State, as well as to advance our knowledge of the cause and prevention of disease. The specialist in his laboratory has but little opportunity of seeing cases other than experimental ones, or of knowing even what is going on among practitioners, and it is here that you can aid us greatly, and in return we will do all we can to aid you. While it requires much time and attention to do good bacteriologic work, for which reason the science will probably always remain to a great extent in the hands of specialists, every practitioner can readily acquire enough of the technic and of the principles on which it is founded to enable him to secure cultures and specimens which can then be worked up by a specialist in the laboratory. I lay stress on this point, because much valuable material goes to waste through improper methods of collection, and the bacteriologist is often blamed for what is not his fault. A few words on this point may not be amiss.

The apparatus required for making cultures is not elaborate. A stout platinum needle mounted in aluminum, an alcohol lamp and a few culture tubes are all that will ordinarily be required. Cases containing these things may be obtained from the makers of surgical instruments. In addition, a few sterilized pipettes made from glass tubing are often useful. Beyond these things nothing is required except the instruments which every practitioner has.

If the culture or specimen is to be taken post mortem, let it be as soon as possible after the death of the animal. The internal organs, especially, soon after death, become invaded by intestinal organisms, and our work may thus be hindered or even rendered entirely negative. The surface of the organ from which the culture is to be made must be seared with a hot piece of metal and the needle plunged through the sterile area thus formed. Blocks of tissue for the cutting of sections must also be taken as soon after death as possible, and preserved in 95 per cent alcohol, or in absolute alcohol if the tissue is to be examined for bacteria. Blood, pus, urine, etc., are, as a rule, best collected by means of a pipette, or where a large quantity is wished, a sterile canula may be used, the fluid being drawn into sterile glass-stoppered vials. The cardinal principle is always to use sterile apparatus, this end being attained by the use of heat, either dry or moist. As a rule, large quantities of material are not required. The sterilization of implements and receivers is readily done in your own homes by boiling in water for fifteen to twenty minutes, or exposure in the oven of a stove for one hour or more. In many houses the Arnold steam sterilizer may be found, making the process still more easy. Do not think that the elaborate apparatuses often seen in laboratories are necessary to accomplish your ends. The principles once mastered, efficient apparatus may often be improvised from the ordinary household utensils. One of our great American surgeons was in the habit of saying that he treated fractures with "splints and common sense." Success in bacteriologic work depends largely on the latter element, and I may add one more—attention to details. A chain is no stronger than its weakest link.

Such is an outline of the rules to be observed in all cases, though they may be modified more or less, according to the disease we are investigating. For instance, material from the

intestines, or the discharges from the nostrils in a disease like glanders, will always be contaminated, and no precautions as to the sterility of the containing vessels will prevent it; but even here we should still be strict, for otherwise we could not be sure of the source of the organisms found. Always, whatever the specimen be, it should be sent to the laboratory as soon as possible after collection, and unless it be preserved in alcohol should, as a rule, be kept on ice. I have had the brain of an animal suspected of rabies sent to me in such an advanced state of decomposition that no positive results were possible, the inoculated animals dying as the result of infection from the putrid mass, rather than from any rabic virus it may have contained.

The study of the rarer diseases is very attractive, and in some ways they seem to offer the greatest rewards for our search, but such is not the case. Though they are not to be neglected, it is the wide-spread diseases that will yield the best results in most cases. Tuberculosis is unquestionably the most important, general and destructive disease with which we have to deal, whether in man or in the domestic animals. Too much study cannot be put on it, either in the laboratory or in its clinical manifestations. In spite of the work which has been done on it, the question of transmissibility from animals to man is still somewhat unsettled, there being those who hold the opinion that there are two distinct diseases and both probably non-communicable from one species to another; while by others the cow is regarded as being the most potent factor in the causation of human tuberculosis, and I have heard the opinion expressed that human tuberculosis would disappear if the use of the cow and its products could be stopped.

The truth lies probably in the middle ground. As to the transmission by milk there can be but little doubt I think, but it seems necessary that there must be tubercular involvement of the lymphatics and udder. Tuberculosis may remain localized for years and do apparently but little harm, and then all at once become generalized; hence, an animal with even the smallest manifestations of the disease is a menace to the whole herd, and to those using the products of that herd. I cannot too warmly advocate the stand taken by the authorities in this State as to the slaughter of tuberculous animals, and I regard it as the duty of all who are interested in public hygiene in

its broadest sense to support those who have the carrying out of these laws in their hands. It must be a work of education by those of us who have had the advantages of study and observation. While I do not anticipate the disappearance of the disease entirely by the enforcement of these laws, I do hope for a vast improvement in the health of our people, as well as of our herds.

The diagnosis of tuberculosis is not always easy from clinical symptoms, nor from postmortem examination, but fortunately, in tuberculin or "Koch's lymph," as it is frequently called, we have an almost infallible means of detecting the disease. The bacteriologist with his microscope may not be able to demonstrate the presence of the bacillus in the cheesy masses so characteristic of the tubercular processes, yet the inoculation of a susceptible animal with this material will cause the disease. This fact has given rise to doubt in the minds of some who were inclined to doubt the causative agency of the tubercle bacillus, but is now explained by the formation by the tubercle bacillus in the tissues, of spores which need only to be transplanted to suitable soil to vegetate and multiply. Cultures of the bacillus are reported to have been obtained from the dust of rooms and stables in which it could not be found by the microscope. The difficulty of cultivating the tubercle bacillus makes culture experiments of somewhat doubtful value, but the intraperitoneal inoculation of susceptible animals, like the guinea-pig, offers very much surer results. Milk or pus, for instance, in which the bacillus can not be demonstrated by the microscope, will often cause tuberculosis on inoculation. A volume might easily be written on this subject alone, but I must leave it now with one more suggestion, applicable to all other diseases as well—I refer to collecting statistics and making observations. In this way the practitioner can do an immense amount of good in extending our knowledge, and from his observations laboratory experiments can be mapped out.

There are two other rather common diseases met by the veterinarian in which an early and certain diagnosis is of great importance—anthrax and glanders.

Diagnosis of anthrax is not usually difficult, and the inoculation of a mouse or guinea-pig with a little blood from the suspected animal will make the matter clear. The diagnosis

derives its importance from the necessity of stopping an epizootic outbreak by the use of vaccines, as well as from a sanitary standpoint in the disposal of the carcass. The anthrax bacillus in the growing stage is not hard to kill, but forms most resistant spores which retain their vitality for long periods of time. These spores are never formed in the body during life, but may be present in the bloody discharges. After death when the tissues are opened and oxygen admitted, spores may form. It is taught in some textbooks that at the depth of seven or eight feet the temperature of the earth is so low as to prevent the formation of spores, and that burying the animal at this depth is a safeguard against future infection. Actual thermometric observations on bodies at this depth show that the changes due to decomposition develop heat enough to allow of the formation of spores. Pasteur further showed that these spores might be brought to the surface by earthworms. This has been denied by Koch and his followers, but the experiments of Pasteur appear to me to be conclusive.

We have two rapid and sure ways of diagnosing glanders—by mallein and by the inoculation of guinea-pigs after the method of Strauss. Mallein is a glycerin extract of the bacillus malleus or glanders bacillus. Its use is now as well recognized a procedure as is the use of tuberculin, to which it is closely allied so far as its manufacture and use are concerned. Strauss' method depends on the selective action of the glanders bacillus for the testicle of the guinea-pig when inoculated into the peritoneal cavity. If the culture be virulent, a suppurative orchitis is set up by the third or fourth day, and the diagnosis is absolute. Rupture of the testicle takes place later, and the animal shows general infection.

Among the less understood, and unfortunately, common diseases, I may mention osteoporosis and meningitis as being of peculiar interest. The general remarks as to collection of material for examination apply in these cases. The diseased tissues and the general circulation seem to offer the best material for study, and cultures should be made from these promptly. Results have so far not been satisfactory, but there is no reason to give up the fight. Each year we improve our bacteriologic technic, and there is strong ground for hope that persistent effort will soon be rewarded by the elucidation of the etiology of those diseases.

I have tried to point out succinctly how we may work together, and let me ask you not to depend too much on the specialist. Many of the methods described are easy of application and each practitioner can do much for himself, and derive from it in consequence much more good than he would from work done by another.

OBSTETRICAL OPERATIONS.*

BY P. D. KERSHNER,
Fleetwood, Pa.

Obstetric operations on the domestic animals require that the veterinarian be thoroughly conversant with the anatomy and physiology of the organs concerned in the act of parturition, and that he exercise a proper amount of intelligence and skill.

The most frequent of all obstetrical operations is the mechanical extraction of the fetus. Quite often we are called to a parturient animal in which the only obstruction to parturition is the following: one foreleg crossed over the neck, or the head turned to one side. Occasionally we meet with obstructions of a more serious character, such as monstrosities, malformations of the mother, a dead fetus or a malposition. To alter these we must imitate nature in trying to procure an anterior or posterior presentation and thus to effect a delivery.

Whenever the head is bent either way or the limbs are not presented, we should endeavor first to find them and apply cords. This will save time and labor. In order to procure the head it may be necessary to repel the fetus as far as possible from the pelvis of the mother, so as to gain space. This should be done during the intervals of rest. If the fetus be dead, the mother should be spared suffering by immediate embryotomy.

Embryotomy is the name given to an operation which has for its object the reduction of the size of the fetus and its removal. It may be practiced upon any part or parts of the young animal, but is not considered advisable in cases in which

* Read before the Schuylkill Valley Veterinary Association.

the life of the progeny is of more value than that of the mother. This, however, is rarely the case. It is our duty to effect the delivery of a live fetus if possible, and only after all efforts have failed should we resort to embryotomy unless the fetus be dead. We should always attempt to save the life of that which has the greater value.

The conditions which compel us to resort to this operation are: deformities of the mother, hernia of the uterus, smallness of the genital canal, monstrosities, distortions, abnormal presentations, death, excessive volume or diseases of the fetus. Although rules may be applied to the operation, yet these can not be strictly adhered to; we must operate according to existing circumstances.

Various instruments are used, such as knives, hooks, a saw, chisel, spatula and cord. The most useful knives are the concealed embryotome and the finger-knife; the latter exposes the operator to more danger while entering the genital canal. A common pocket-knife with a stout spring or scapel will answer very well if the blade be wrapped with twine or linen. All knives should have a string attached to the handle; if they slip from the hand they can then be removed with ease and without danger to the mother. Hooks of various sizes are used, either attached to a cord, or held in the hand. Bone-saws and chisels, fortunately, are seldom needed. The spatula is sometimes used for breaking down muscular attachments.

Before proceeding with the operation, the condition of the mother should be determined; if she be weak, stimulants and rest should be given. We dare not be too anxious to finish the operation, but should allow the animal short intervals of rest.

Cephalotomy, having for its object reduction in size of the cranium, is effected in one of three ways: Puncture, incision, or crushing. When hydrocephalus is present, the removal of cranial fluid by a puncture will often remove the hindrance to delivery. In order to puncture, the head must be firmly fixed within the uterine cavity and the perforation made either with a knife or a trocar and canula, the latter being preferred. The point of the stylet should be drawn back into the canula or covered with a cork. The instrument should be held perpendicular to the surface at which puncture is to be made, in order to guard against slipping.

Craniotomy has for its object the reduction in size of the skull. It is performed whenever puncturing does not have the desired effect. For this purpose the bone chisel, embryotome, and common scalpel are used. This operation is rarely indicated.

The fetus may be decapitated to secure space. This operation (decapitation) may prove very difficult as, for instance, when the head is so firmly wedged into the genital canal as to permit little or no motion and, much less, the insertion of the hand.

When the forelimbs are presented, they should be corded and pushed as far as possible toward the fundus of the uterus; then the lower jaw should be secured by a loop or a halter placed over the head. If these attempts fail, recourse may be had to blunt or pointed hooks inserted into the orbital cavities when, by applying strong traction, the head may be brought into a position suitable for delivery.

In cases where double-headed monstrosities exist, one of the heads must be amputated. For this purpose the chain-saw and bone-chisel are very useful instruments.

Amputation of one or more limbs is usually resorted to when they prove to be an insurmountable obstruction to delivery as in some monstrosities, in certain abnormal presentations of the head and abdomen, in emphysema and in death of the fetus. The limb to be amputated must be drawn into the vagina where it must be corded and, through traction applied by assistants, fixed immovably.

To remove an anterior limb the operator secures it, selects the place of amputation, makes a circular incision with a longitudinal one leading from this to the scapula or hip joint, as the case may be.

The tissues between the skin and the muscles are then broken down with the spatula; after the tissues are divided the operator passes his hand to the pectoral or ischial region and pushes against the body of the fetus, while his assistants pull on the cord, thus removing the entire limb without pain to the mother. Amputation of a hind limb is to be performed when the hock is presented as an immovable body, or in case this extremity interferes with the limb. Amputation of a posterior limb is more tedious than of an anterior limb.

In all operations upon the fetus it is good practice to leave sufficient skin or muscle to cover the bones, giving ample protection to the maternal organs. On account of malpositions

and diseases of the fetus, as well as abnormal conformation of the mother, evisceration of the abdominal or thoracic cavity is sometimes indicated. This is accomplished by cording the parts presented and carrying a scalpel in the hand to the sternum of the fetus, where it should be thrust into the thorax and an incision made from above to below. The thoracic contents may then be easily removed by the hand.

Induration of the uterine cervix is a pathologic condition which may require either a Caesarean section or vaginal hysterotomy. After all palliative treatment has failed, cutting into the cervix should be tried. In cases where labor has proceeded for such a length of time as to produce prolapse of the vagina, the operation is simplified by the prolapse. A common scalpel, concealed embryotome or probe-pointed bistoury is necessary. However, if prolapse of the vagina be not present, the hand should be passed to the cervix, and a finger inserted to draw it toward the vulva. Where no adhesions exist this proves successful. While an assistant separates the lips of the vulva, the operator carries the knife to the cervix and makes two incisions, one on each side; if more are required, then one may be made in each quadrant. It is dangerous to make an incision near the median line in the lower half of the cervix by reason of the proximity of the bladder. Nor should incisions be too deep, or they may favor laceration of the parts during delivery. After incision of the cervix, pressure of the hand will produce the desired effects; pressure and traction must be applied by degrees so as to allow the cervix to accommodate itself to the change. The after-treatment consists in the removal of the fetus and its appendages, local antiseptics, diuretics, febrifuges, etc. The purulent discharge which may flow from the vagina for a period of a week or more, will have little effect on the animal. Statistics show that about thirty per cent of the animals operated upon will die.

Gastro-hysterotomy, or *Caesarean section*, is an operation which has for its object the removal of the fetus through an incision in the uterine wall. It should never be attempted until all other means have failed, as it is one of the most serious operations to which the domestic animals can be subjected. When the practitioner has decided to operate, no time should be lost, as delays prove dangerous to the strength of the mother. The instruments and materials generally used are: scalpel, probe-

pointed bistoury, forceps, scissors, hooks and chain, needles, silk, catgut or silver wire, and a large piece of muslin for bandaging. The animal should be placed in a recumbent position, the right side up, the right iliac region thoroughly cleansed and disinfected. The patient is then to be anesthetized with chloroform or ether, all limbs being firmly secured except the right posterior member. When everything is in readiness, an assistant should extend the right posterior limb; the operator now makes an incision into the right flank below and in front of the external angle of the ilium to avoid the circumflex iliac artery, and parallel with the fibres of the external oblique muscle. This incision in the mare and cow should be about twelve or thirteen inches in length; in the bitch four to five inches, and in the sow eight. The muscles should then be cut through to the peritoneum; with the scissors, a small button-hole is cut in the peritoneum and the opening enlarged by means of a probe-pointed bistoury, the fingers acting as a guard against the intestines. Care should be taken that the intestines do not escape from the abdominal cavity. The arm is then inserted within the cavity and the uterus brought to the incision in the abdominal wall.

Two assistants are now required to press on the edges of the wound and prevent infection of the abdominal cavity from without. Incise the uterus slowly and avoid as far as possible wounding fetal membranes and the fetus. Two fingers are thrust through this incision, while the other hand, carrying a probe-pointed bistoury, cuts an opening parallel to the first. If the membranes still adhere to the uterus they should be opened so as to allow the removal of their contents, great care being taken to prevent their entering the abdominal cavity. The presenting parts of the fetus are then to be seized and the fetus removed. The umbilical cord is to be torn or ligatured, the latter preferred. The fetal membranes must now be removed and the fluids taken up by means of a sponge moistened with a carbolic acid solution.

The edges of the wound are brought together by means of the quilled suture, a small opening being left at the inferior end to allow the escape of wound-secretion. The wound is dressed with iodoform and tannic acid, covered with iodoform or corrosive sublimate gauze, above which is placed a thick pad of absorbent surgical cotton, tow or oakum, drenched with a

carbolic solution. This dressing is covered with strips of strong muslin held in place by some such adhesive material as shoemakers' wax. Apply over this dressing another antiseptic dressing and secure it by a body-bandage which may be tightened after the animal gets upon her feet, as occasion may require. After-treatment consists of keeping the animal standing, giving easily-digested food, diuretics, febrifuges, etc., as the case demands.

In cases where the fetus is dead and already decomposed, the operation generally proves fatal by septic infection. The unfavorable complications with which we have to contend are: metritis, peritonitis, metro-peritonitis, septic infection and abscess. This operation is more successful in the bitch and sow than in the mare and cow. The incision may be made along the linea alba or in the left iliac, though I prefer the right iliac region in the mare and cow on account of the dispositions of the intestines and their weight. Even in the bitch and the sow the right iliac operation is to be preferred.

SELECTIONS.

RADICAL OPERATION FOR UMBILICAL AND
VENTRAL HERNIA IN ANIMALS.

BY P. CORDELIER.*

After reviewing the diverse modes of treatment of umbilical and ventral hernia recommended in treatises on veterinary surgery, we find nowhere recommended a radical cure for hernias, and, if some methods of treatment are recommended, they are only such as may result in unfavorable complications. These complications, formerly very much dreaded, can be avoided by methods of antisepsis, whose rational application in surgery now permits the surgeon to practice the gravest abdominal operations. Veterinarians, in our opinion, should follow step by step the progress of human surgery.

In this short article we will endeavor to demonstrate that the radical operation for hernia, performed in accordance with the principles of antisepsis is more harmless than has formerly been believed. The observations which we have made in the last three years are too few to justify a claim that this radical cure is the best means of treatment of umbilical and ventral hernias; but as our operations have thus far been crowned with success, we cannot too strongly recommend to our colleagues the importance of every means that may make abdominal surgery an everyday practice.

We have performed the radical cure upon three colts, aged from six to eight months, affected with voluminous umbilical hernia, and upon two dogs with accidental ventral hernia. In all a cure was quite rapidly effected, and only once was it necessary to operate a second time, having in this case employed for the abdominal suture catgut which was too thin and consequently was absorbed before complete adhesion of the lips of the wound had taken place.

Without giving in detail a description of the diverse methods of treatment, we will review them with a few short comments.

*Rec. de Med. Vet.

1. *Bandages*, adopted by a large number of practitioners, and which for a long time were relied upon in human surgery, are only efficacious when they can be maintained continuously against the tumor. Our patients not remaining very quiet, it is difficult to apply these bandages. This inconvenience is still more marked in animals that are obliged to work; besides, in ventral hernia a cure can only be effected if the bandages are applied during the first few days after the accident.

2. *Nitric acid cauterization* has given and still gives satisfactory results, but its application must be made very methodically. If it be improperly applied it may lead to serious accident: tetanus, peritonitis, intestinal fistula and especially eventration. Fearing this last complication, we always hesitated to employ this method in very aggravated cases.

3. *The mixed method*, consisting of the combined employment of irritants and bandages, facilitates the development of fibrous tissue over the orifice.

4. *The surgical methods* comprise different procedures, which may be reviewed as follows: reduction of the hernia, then occlusion of the sac by pressure or suture. They differ from one another only in the apparatus used as the compress, or in the kind of suture. These last methods have given excellent results and we do not hesitate to employ them at the present day, but after the separation of the constricted parts there remains a more or less large wound whose cicatrization is sometimes slow. The edematous swelling disappears quite rapidly, and ordinarily three weeks suffice for the obliteration of the hernia. The deformity of the umbilicus can, however, be seen for some time, and we must wait for the cicatricial contraction to produce a permanent closing of the opening.

Although the radical cures which we have attempted have always been crowned with success, it is not our intention to recommend them in all cases of umbilical or ventral hernia. The former, which may be either congenital or acquired, may sometimes disappear spontaneously, a fact which is observed in all the animal species. Umbilical hernia in herbivora often disappears at the time of weaning, and it may even be reduced mechanically by the development of the large abdominal organs.

But if we have made the radical cure the subject of this paper, it is in order to show that it can be practiced without

danger, and that it has given us unexpected results in cases of voluminous umbilical hernia complicated with irreducible adhesions. Besides, if the chances of success are only probable, and if, as before the discovery of antiseptics, a traumatism to the peritoneum would be fatal, we would be less bold in making our recommendations.

Indications:—Umbilical hernia being apt to disappear spontaneously in certain cases, and being sometimes reducible by the methods mentioned above, we will not advise a radical cure in an absolute manner. We will reserve it, on the contrary, for old, voluminous hernias, difficult of reduction and complicated by adhesions.

In cases of strangulation, the operation is imperative. This complication is rare, but it does exist and renders an operation necessary. Inflammation of the hernial sac, rendering the enlargement hot and painful, and accompanied by colicky pain, also calls for the radical operation.

This operation has been practiced for a long time in umbilical hernia in man. Duplay recommends it in all cases in which the hernia is voluminous, difficult of reduction and accompanied by frequent colicky pains. In hernia through the linea alba in front of the umbilicus—also called epigastric hernia—a radical cure has for a long time been recommended in human surgery, and Terrier in his thesis arrives at the following conclusion. Omental, intestinal and omento-intestinal hernias which cause gastro-intestinal troubles, pain and deformities, ought to be treated as all other hernias, that is to say, by the reduction of the hernia, excision of the sac, freshening of the fibrous ring and suturing of the abdominal wall. In veterinary surgery, at all times, the radical cure of ventral and umbilical hernia has been deprecated.

Operation—Preliminary preparation.—Three or four days before the operation the tumor, previously shaved, should be covered with a layer of borated or sublimated vaselin. Before making the incision, the field of operation should be carefully washed with soap suds and a five per cent solution of phenol. Then compresses, impregnated with an antiseptic solution, should be placed on the skin around the hernia, on which to rest the hands of the operator and his assistant.

The instruments should be previously disinfected in glycerin or boiling oil, and placed for fifteen minutes in a strong

phenicated solution. The hands of the operator and his assistants should be cleansed in the sublimate solution. All the accessory materials should be thoroughly antiseptic. The object of the operation for a radical cure is the obliteration of the hernial sac and the occlusion of the ventral wound, *i.e.*, the restoration of the continuity of the abdominal wall.

The *first step* consists in the incision of the skin covering the sac. The latter is constituted by a diverticulum of the peritoneum or by a pseudo-serous layer developed at the expense of the subcutaneous connective tissue. This sac may be absent in certain cases of ventral hernia when the peritoneum was perforated by the force of the intestines. An incision is then made through the skin, extending slightly beyond the base of the tumor in front and behind. After dissecting through the subcutaneous tissue and raising the skin, the hernial sac is exposed. The latter is then incised with care in order not to involve the intestine.

If the intestine is not adherent, it is pushed back into the abdomen and maintained there by an assistant with a sponge or an antiseptic compress until the sutures are inserted. If it is adherent, it is freed as much as possible and reduced as in the first case. It is very evident that if during all these manœuvres an intestinal perforation should take place it would be necessary to use appropriate sutures.

The hernia being reduced, the *second step* of the operation follows; that is, the obliteration of the orifice. This is accomplished by suturing both this orifice and the integument. The method of procedure is the same in ventral as in umbilical hernia. With a bistoury or a pair of scissors the lips of the orifice are previously freshened. If the orifice be circular (umbilical hernia) it is advisable to remove some of the tissue in front and behind in order to give the orifice a more elongated form and to facilitate the apposition of its lips. The borders of the ring are maintained in apposition by means of strong catgut. The number of sutures vary with the diameter of the orifice. The integument is then sutured separately by means of needles or Florence hair.

If the flap of the skin is too large, as may be the case in voluminous hernia, a portion of the skin may be resected.

After-treatment.—This is very important, and should be strictly antiseptic. After having sprinkled the line of suture

with iodoform or salol and applied iodoform gauze, the parts are covered by a compress of sterilized oakum. The whole is maintained by a wide bandage passing three or four times around the body. The frequency of dressing varies with the progress of the wound, which should not be touched for the first five or six days if no complications arise. Ordinarily, two or three dressings suffice to complete the cicatrization in about two weeks. The author reports five cases in which, with the above treatment, a cure was obtained without any complication.

INTRAVENOUS INJECTIONS OF SODIUM SALTS.*

BY BOSC AND VEDEL.

We first studied the physiologic action of these injections in healthy animals, and subsequently the effects and best operative conditions in cases of experimental infection. By means of these data we have been able to study the therapeusis of salt injections in cases of infectious disease in man, and have endeavored to explain the pathologic physiology that underlies them.

I. In order to determine the physiologic action of salt injections we separately studied the role of the vehicle, ordinary or distilled water, and the salts, chlorid and sulphate of sodium.

If ordinary water be really toxic, even in small doses, distilled water, on the contrary, is deprived of all toxic properties. In any dose it provokes abundant urination without hematuria, determines a slight febrile reaction— $\frac{1}{2}^{\circ}$ to 1° , and alters the blood corpuscles so little that it could by itself be used for intravenous injections.

We have studied the effects of simple salt solutions, chlorid of sodium alone, and of compound salt solutions, chlorid and sulphate of sodium.

Simple Salt Solution.—Before studying the effects of large injections it has appeared necessary to determine the dose and toxic effects of the chlorid of sodium. We have injected into veins of dogs variable quantities of a 7 per cent solution.

* *Ann. de Méd. Vét.*

Chlorid of sodium is fatal in the dog only in large doses—three and one-half grams per kilogram of live weight—and it becomes really injurious only when the quantity exceeds triple the amount normally found in the entire volume of blood.

Toxic doses develop a series of symptoms simulating strychnin poisoning, with intense tetanization, secondary convulsions and excessive hyperthermia (108° Fahr.), while therapeutic doses accelerate the heart without altering the blood-pressure, increase the urinary secretion, raise the internal and peripheral temperature 1° to 2° above the normal, but do not otherwise affect the general condition.

The pain produced by the injections, and the excitation resulting from the convulsions, seem to contraindicate the strong solution.

The injection of a large quantity of simple salt solution (5 to 7 per cent) produces no immediate or remote toxic effects, while at the same time it may equal triple the total volume of blood. We have injected from three to eight fluid ounces per kilogram of weight, at the rate of from one-half to three ounces per minute. This injection increases the frequency and energy of the heart without altering the blood-pressure, elevates the rectal and peripheral temperatures two degrees, returning to the normal in from two to three hours. Urination is frequent and abundant, without hematuria or albuminuria. Toward the end of the injection, salivation, diarrhea and chills are seen. The nervous system is not influenced and the injection does not seem to be painful.

These reactive symptoms, especially the fever, are not influenced by the rapidity of the injection nor the temperature of the liquid injected; they are identical whether a single injection or a series of them be given.

A 5 per cent solution of salt has the same effects, excepting that the fever and the diarrhea are not so marked as when a 7 per cent solution is injected.

A large injection of the chlorid and the sulphate (7 per cent) produces the same effect as the simple saline solution. This shows that the addition of sulphate of soda is of no advantage. Our experiments have led us to believe that the simple 7 per cent chlorid solution possesses the minimum toxic action and the maximum physiologic effects. This solution should be preferred in intravenous injection.

II. We have experimentally studied the effects of the simple saline solution in the dog infected by the injection into the veins of cultures of the coli-bacillus. This infection causes death in from twelve to forty hours, according to the dose. It is essentially hemorrhagic and is accompanied by gastro-intestinal trouble, excessive feebleness of the heart, sudden and intense lowering of the blood-pressure, suppression of urine, elevation followed by depression of temperature, relaxation and collapse.

The intravenous injection during or immediately after the inoculation retards the evolution of the disease and attenuates the symptoms in general. It augments the frequency and energy of the heart, elevates and maintains the blood-pressure, produces a quick thermic reaction, urination and perspiration. Several successive injections can effect a cure. In cases of moderate infection, a simultaneous injection not only attenuates the symptoms but prevents the development of infectious phenomena.

If saline injection be made after the inoculation, the effects of the latter are very much attenuated and a cure is still possible. Successive injections maintain and complete the good effects of the primary injection. If the first injection be made too late and the lesions progress too rapidly to be remedied, the injection slightly ameliorates the pulse but is incapable, even if successive injections are made, of preventing the hyperthermia and weakness of the heart. The infected organism does not withstand very large injections with the same impunity as the healthy individual; they enfeeble the heart and produce a veritable asphyxia, a comatose condition with convulsions in consequence of a bloody effusion into the peritoneum, hemorrhagic edema of the lungs and meninges of the brain.

It is best to inject from 6 to 8 drams, per kilogram of weight, at a rapidity of 1 to 1½ ozs. a minute; deprived of all injurious effects, this furnishes the maximum reactive symptoms. In a general manner it is necessary to make from 2 to 4 injections in order to effect a cure. The first injection should be made as soon as possible after the inoculation. The longer the injection is deferred, the less certain will be the recovery. As regards successive injections, these must be based upon the condition of the heart, the rise in temperature and the diuresis.

The prognostic indications for the patient must be drawn from the intensity of the general reaction, its duration and the comparison of the results with those of previous injections; the reactive effects become attenuated after the first injection, in cases of recovery, in proportion to the intensity of the infection. The reactions also diminish when the injections are too small, while at the same time the phenomena of infection progressively diminish.

III. We have employed for therapeutic purposes large saline injections against infections of different types.

1. *Cholera*, a hyperthermic disease, essentially weakening and of rapid evolution.

2. *Pneumonia*, an acute febrile condition.

3. *Septicemias*, febrile conditions with grave variations and of slower evolution. In all cases the injection was large, a mean of three pints of saline solution in fifteen to twenty minutes.

In *Cholera*, a disease simulating coli-bacillus infection, the intravenous injection has produced an attenuation of the disease. During the injection the general condition was rapidly modified, the pulse became strong, its intermittent condition disappeared, the blood-pressure was restored, the respirations became more full and easier and the temperature was progressively raised. After the injection these effects continued, but at the end of from thirty to forty minutes a critical reactive period accompanied by sweating with alternate stages of chills and fever occurred. The state of chilliness commences with violent chills, a frequent, uneven pulse, accelerated respiration and a rapid elevation of the peripheral and central temperatures of from 104 to 106° F. In the state of fever which follows, the face becomes flushed, the conjunctivæ injected, the respiration panting, the pulse very accelerated, the temperature high, and the tendinous reflexes exaggerated; then all these phenomena diminish progressively. Subsequent to this reaction the temperature may become normal and a recovery follow, although the latter may be preceded by intervening reactions.

Pneumonia.—We have treated two cases of pneumonia. One case was pneumonia of the apex with adynamia in an alcoholic, with a temperature elevated for six hours. Under the influence of an intravenous injection there developed phenomena similar to those which we have described in cholera, a hyperthermic disease; in a few hours the temperature, having

been 104.5° , fell to 98° , and after slight variations remained normal. It can not be said that the injection produces a natural crisis, because this disease has a course which does not tend towards resolution.

In the second case it was necessary to make two intravenous injections. In consequence we were able to develop the reactive phenomena above indicated and, although the pneumonia had existed for eleven days, and the first injection was made during the height of the disease, it may be said that the latter was arrested. If the temperature does not become normal after the first injection, it is probably due to the fact that a pleuritic complication exists, which renders recovery less rapid.

Septicemia.—In two cases of septicemia due to a staphylococcus, with disseminated purulent centres and great variations in temperature, the intravenous injections produced favorable effects. In each case the injection was followed, not only by a normal temperature and a rapid recovery, but the general state was improved, the pulse became stronger, the blood-pressure increased, the variations in temperature much less marked, and the purulent centres became smaller and finally disappeared. The patients have thus insensibly, but always gradually, recovered under the influence of several injections, in spite of the fact that the first one was sometimes made when the conditions were most critical.

There is always an indication in cases of infectious diseases for intravenous saline injection, such as we have recommended above, but here, as in all experimental infections, it is indicated to make the injection as soon as possible after the commencement of the disease. The urgency is indicated by the general state of the pulse, the blood-pressure and the general condition of the patient. Anuria is no longer a contra-indication; with the usual doses and the rapidity indicated, accidents are not possible, nevertheless, it is necessary to take into account the state of the brain and the nature of the infection. If the kidneys be very much or irremediably affected it is not safe to inject large doses, especially when there exists pulmonary edema. It is equally necessary to graduate the injection when there exists a hemorrhagic disease, such as colibacillus infection, so as not to aggravate the phenomena that are induced by the affection.

HYDROCHINON, RESORCIN AND PYROCATECHIN.*

BY PROFESSOR DUPUIS.

These three dioxyphenols exercise upon the organism an action almost similar to that of phenic acid, but are less toxic than the latter. Pyrocatechin has the strongest action, but resorcin is the one most frequently employed in medicine.

Pharmaceutical Properties.—Resorcin is found in the form of crystals or scales similar to benzoic acid crystals. They are colorless, but become pale rose-colored when exposed to the air. It has a sweetish, resinous and disagreeable taste, and a slight odor of carbolic acid.

Resorcin is soluble in water, alcohol, ether, olive oil, but is insoluble in chloroform.

Pharmaco-dynamics.—A weak solution (2 to 5 per cent) of resorcin does not irritate either the skin or the mucous membrane. It is feebly astringent and hemostatic and slightly anesthetic. It slightly coagulates the albumin of the tissues and acts as an antiseptic. It prevents the formation of excessive granulations on wounds, and has a beneficial effect when there is suppuration. It destroys in the same manner as phenic acid the organisms of fermentation and putrefaction. In a concentrated solution it acts upon the skin as a caustic; it coagulates the surface of wounds and produces a whitish eschar which after separating leaves a red surface that tends rapidly to cicatrize.

Taken internally in small doses, resorcin is an excellent antiseptic. In healthy animals its action is manifested only by a tendency to constipation, but in the intestines it destroys parasites and pathogenic organisms, or arrests their development, and prevents abnormal fermentation. This antiseptic action is especially advantageous when these fermentations excite diarrhea.

The general effects following the administration of therapeutic doses are the same as those produced by phenic acid. It is rapidly absorbed and acts as an antipyretic, which action is especially evident when there is high fever. This antipyretic

* Ann. de Méd. Vét.

action, however, is generally of short duration and the temperature afterwards rapidly rises to the same point as soon as the administration of the drug ceases.

In a dog to which we gave fifteen grains of resorcin the temperature was lowered ten degrees in two hours, but rose again to the same point two hours afterward. Large doses produce toxic phenomena which recall those produced by phenic acid.

The action of resorcin is principally upon the nervous system and, more especially, upon the spinal cord, whose different centres are successively irritated and paralyzed. A small dog to which we administered a draught containing forty-five grains of resorcin, at once showed muscular trembling over the entire body, frequent vomiting, movements of the jaw with constant licking of the lips. About two hours afterwards weakness of the hind quarters was noticed, and the animal presented a succession of muscular tremors, followed by convulsions and loss of consciousness. The eyes appeared haggard, pupils dilated, conjunctivae injected. The respirations were frequent, labored and panting, the animal breathing through the mouth. In addition to these phenomena there were salivation and perspiration, the former being very abundant. The urine was clear and of a red color. The weakness in the hind quarters became more marked and, finally, they became paralyzed; this was followed by general collapse, the animal passing into a state of profound stupor from which it gradually recovered its normal state. After the administration of still larger doses the same phenomena appear and finally the animal succumbs to paralysis of the vasomotor and respiratory centres.

Pharmaco-therapeutics.—A 1 to 5 per cent solution is a good local anesthetic. It is used for this purpose in surgical operations or in the treatment of recent wounds that are suppurating. It is employed with advantage in diseases of the skin, such as erythema, herpes, eczema, and chronic acne. A 5 to 10 per cent ointment may be employed instead of a solution.

It is also employed in catarrhal inflammation of mucous membrane, particularly in conjunctivitis (1 per cent), urethritis and cystitis. It is of especial use when these diseases are accompanied by purulent secretions. It acts in these cases as an astringent, antiseptic and mild local anesthetic.

As a caustic, it is used in the local treatment of diphtheria, necrosis, gangrenous and fetid wounds. It is also used for the destruction of tumors, such as papilloma, adenoma, epithelioma and lupus. It is prescribed in these cases in the form of a concentrated solution or as a strong ointment frequently applied. (Ointment: resorcin 3-8 drams, vaselin 4 drams). In this manner a rapid cauterization may be obtained. Resorcin produces in this manner very little pain. Its daily application provokes the formation of an eschar which separates spontaneously.

Internally, resorcin can be used as an antiseptic, preventing abnormal fermentation in the digestive apparatus. It is employed in small doses when a disinfection of the gastro-intestinal tract is indicated. It is used in intestinal catarrh when the latter is of an infectious character, and is especially advantageous in the diarrhea of calves.

Certain respiratory diseases are also beneficially influenced by resorcin, especially those resulting from the action of pathogenic germs. As it gives in man good results in whooping-cough, it should likewise be of advantage in animals against microbic diseases of the bronchi and lungs. In distemper of the dog it is given internally in liquid form, pills or in the form of fumigations.

Resorcin is not generally used as an antipyretic. It has been proved that it lowers temperature in various diseases, but there are other antipyretics of more value. Its action is of very short duration and it must be given in large doses, which readily produce profuse perspiration as well as other inconveniences.

Administration.—Externally, resorcin is sometimes used pure, more often in aqueous solution and also as an ointment made with vaselin or lard. Dissolved in water, it is useful as a lotion and at times in fumigation. In surgery, resorcin bandages and gauze are also employed.

Internally, it is given in solution, as an electuary or as a pill. The drenches are prepared by dissolving it in water, or making an emulsion with the yolk of an egg or gum arabic. *Doses:* Dog, 5 to 30 grains. Calf, $\frac{1}{2}$ to $1\frac{1}{2}$ drams. Large animals, 4 to 6 drams. Hydrochinon and pyrocatechin can be used for the same purposes as resorcin, but are about four times as strong.

ABSTRACTS.

CASTOR OIL AGAINST WARTS.

A statement is made in a number of reputable journals that if castor oil be applied to a wart once a day for a month the wart will entirely disappear. In many cases it will not require so long a time.—*Bulletin of Pharmacy.*

UMBILICAL HERNIA; TETANUS AND ANTITETANIC SERUM.

Dieudonné has during recent years lost three cases of tetanus out of ten operated on for umbilical hernia. Since he has employed antitetanus serum, tetanus did not occur. Of three young animals operated on at the same time of the year and under the same conditions, one died from tetanus because it had not been injected; the other two which were injected presented no complications.—*Rev. Vet.*, November, 1896.

LOCAL ANESTHESIA.

Cagny has obtained excellent results in producing local anesthesia with a 10 per cent liniment of guaiacol in painful swellings following strains and contusions, in the insertion of setons and puncturing of abscesses, as well as in stopping the itching following cauterization of a part.

In cauterizing in lines, the animal was much more quiet after applying to the parts an alcoholic solution of guaiacol. It may facilitate firing in points in the standing position.—*Rev. Vet.*, November, 1896.

CHRONIC FOUNDER.

Thomas recognizes a new means of treatment in chronic founder. He has obtained a decided improvement by the extirpation of a portion of the wall at the toe. This operation does not prevent the bulging of the sole which follows. The theory which attributes the dropped sole to the interposition of the kerapyllocele between the wall and the os pedis is therefore

not acceptable, and the author thinks that the descent of the third phalanx is due to the simultaneous action of the weight of the body and the traction of the perforans tendon.—*Rev. Vet.*, November, 1896.

TREATMENT OF PROLAPSE OF THE VAGINA.

Villemin derived much benefit from puncture of the rumen in prolapse of the vagina and uterus.

The puncture of the rumen considerably attenuates the expulsive efforts; it acts in the same manner as tracheotomy, and may therefore be used in all cases where there are very violent expulsive efforts.

In some cases, the eversion of the vagina is due to acute indigestion. The accident is rarely seen excepting in subjects with low vitality, lymphatic, relaxed uterine ligaments and subject to indigestion.

CYSTOCELE AND PARTIAL REMOVAL OF THE BLADDER IN THE MARE.

Hartenstein reports an eversion of the bladder in a mare during parturition. The hernial bladder was found in the vagina and protruded between the lips of the vulva. Its nature was easily recognized by two jets of urine escaping now and then from the ureters. The thickening of the wall of the bladder rendered its reduction through the urethral opening impossible. A ligature was then placed around the organ posterior to the orifices of the ureters. The results of the operation were highly successful, and after a certain time the stump reduced itself spontaneously.—*Jour. de Med. Vet.*, September, 1896.

ENZOOTIC CORYZA.

Robin has studied a peculiar disease of an epizootic nature in the bovine species, characterized by inflammation of the mucous membrane of the nose and nasal sinuses. The symptoms remained local and there was no fever. It was therefore not a gangrenous coryza, but rather a benign inflammatory coryza accompanied by sneezing, wheezing and a discharge at first serous and soon becoming purulent and abundant. In

all cases, with one exception, a rapid and complete recovery was obtained by injections of a borated solution, emollient fumigations, revulsive applications, etc.

The affection was attributed to the inhalation of particles of dust from a limestone pasture, after a long drought.—*Rev. Vet.*, November, 1896.

BOLDIN IN JAUNDICE IN THE DOG.

According to Bissauge, icterus in the dog is an almost incurable disease. He has for this purpose employed boldin with very good results. This is an alkaloid obtained from "boldo," an evergreen shrub in Chili; the leaves are the medicinal parts.

This alkaloid is a white powder which becomes yellow with age, and especially when exposed to air and light. It is bitter, without any special odor, soluble in alcohol, ether, chloroform, and but sparingly in water. In Chili boldin is employed as a specific in diseases of the liver.

Experiments show that it is an excitant of the digestive processes and to the secretion of bile.

It is employed in the form of granules containing 1 milligram; 5 to 8 are given daily, which may be increased to twenty per day.—*Ann. de Méd. Vét.*

REMARKABLE MULTIPLE GESTATION IN THE COW.

In the bovine species twins are relatively frequent, and in certain years more than in others. Triple gestation is more rare. There are a few instances of quadruple gestation. Lessona cites a cow eighteen years old which at one parturition gave birth to five calves which lived for eight days; three were females. He has also seen another similar instance in which five calves were still-born.

Gerrand, an English veterinarian, in 1854 witnessed the birth of five living and vigorous calves.

Delamare made a post-mortem examination on a cow which had died three weeks before term from unknown causes. He found six calves, of which four were males, and all were normally developed. Death was caused by their enormous volume.—*Ann. de Méd. Vét.*, November, 1896.

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LYMPHANGITIS.

Before the swelling of the members, we find that, after a more or less long period of rest, the animal suddenly suffers from intense fever accompanied by the usual train of symptoms. Dages thinks that in the face of such signs, with the viscera apparently normal, the practitioner should turn his attention to the circulatory system. There are strong, vibrating beats of the heart, and a metallic tone to the heart sounds which are sometimes double; but the most diagnostic signs are furnished by the pulse, which is full and rapid, and shows a "metallic vibration" recognized by the finger pressing upon the artery.

The author does not consider this variety of lymphangitis of microbic or infectious origin, but due to a "want of vitality or a mal-nutrition of the cells of the economy in consequence of prolonged inactivity."—*Rev. Vet.*, November, 1896.

THORACENTESIS.

This operation has been very much discussed as to its utility, but Huguier believes that most objections will disappear when one takes into consideration the opportune moment at which the operation should be done. Whilst most authors indicate puncture when the pleuritic liquid is abundant and the consecutive dyspnea intense, the author thinks that thoracentesis in order to be productive of good results should be practiced earlier, because a pleuritic liquid itself is a constant cause of inflammation upon the healthy parts of the pleura.

The complications of puncturing the thorax, such as syncope consecutive to a rapid emptying of the chest, penetration of air into the pleural cavity and suppuration can be easily avoided if the operation is performed carefully. Huguier gives observations in which the action of thoracentesis was beneficial.—*Rev. Vet.*, November, 1896.

SPASM OF THE NECK OF THE UTERUS.

Strebel, basing his opinion upon a long series of observations, believes that spasm of the neck of the uterus is extremely rare, if it does exist at all. He cannot understand, in fact, how such a contraction could continue for 2, 3, 4 or even 5 days.

He believes that the natural forces themselves, can overcome this obstacle, and that these supposed cases of spasm of the uterine neck represent nothing more than premature parturition. It suffices to keep the animal quiet and, ordinarily, parturition will follow spontaneously in the course of two or three days. The author recommends surgical interference only when it is a question of induration, or the calcareous infiltration of the neck of the uterus. He thinks that belladonna, atropin, warm injections, etc., enjoy an undeserved reputation.—*Ann. de Med. Vet.*, November, 1896.

PARTURIENT APOPLEXY.

Bissauge, in the treatment of this disease, believes in washing out the uterus, because this has given him very good results—65 recoveries in 100 cases.

Whether the placenta has come away or not, he proceeds to flush the uterus. With the aid of a sound with a double canula he introduces into the uterus twenty-five to fifty litres of warm water containing some lysol, until the water returning through the other tube is clear; the water remaining in the uterus is then taken up with a sponge.

The author also recommends purgations, or even drastics, for the elimination of toxic products. He gives preference to an aloes ball, to which is added croton oil, to be administered on the first visit. The treatment is completed by hypodermic injections of sulphate of veratrin and arseniate of strychnin. Repeated drenches should be avoided as much as possible; finally, the rectum should be stimulated by frequent injections of water containing common salt or sulphate of soda.—*Rev. Vet.*, November, 1896.

CHLORID OF BARIUM IN COLIC.

Zschokke experimented with a 10 per cent. aqueous solution of barium chloride on horses in good health, in doses of 15, 10, 7 and 5, c. cm., injected into the jugular. The skin is shaved and washed over the middle of the jugular gutter; the vein is then dilated as in phlebotomy, and the needle introduced obliquely. In all cases, movements of mastication were observed in from 3 to 30 seconds, and continued from 15 to 30 minutes.

In from $1\frac{1}{4}$ to $3\frac{1}{2}$ minutes peristalsis was marked: first, escape of flatus, then feces. The horse which received 1.5 grams, groaned and made violent expulsive efforts. In those receiving smaller doses, these symptoms were more mild. In a few minutes all expelled soft fecal matter. In no case was there salivation or sweating.

As it is not always convenient to make an intravenous injection in horses suffering from colic—Zschokke employed the same agent subcutaneously. He injected several horses with 5, 10, 15, 20, c. cm., of a 10 per cent solution.

Most of the above symptoms were produced, but more slowly and with less intensity, excepting abdominal pain which appeared much more marked.

The author prefers the intravenous injection, which is neither dangerous nor difficult.—*Ann. de Med. Vet.*, November, 1896.

THE STERILIZATION OF CATGUT.

Catgut, which in its raw state is so extraordinarily productive of infection, offers such obstacles to sterilization that many surgeons have desired to banish it entirely from use as part of their bandaging apparatus. But as catgut still remains the only absorbent sewing-material, constant attempts are made to sterilize it. Dr. Saul, in a paper read before the Berlin Medical Society, states that he has tried lately boiling it in alcohol, with the best results; that is, the catgut stands the process well, and the degree of sterilization is high. By the addition of water (up to twenty per cent) a considerable increase of disinfective value is produced, but, on the other hand, not by a combination of alcohol and carbolic acid. If, however, water and carbolic acid are added to the alcohol, a very high degree of disinfective value is reached. The most efficacious combination consists of eighty-five parts of carbolic acid, and ten parts of water; by this, splenic fever spores are destroyed in ten minutes.—*Berliner Thierärzt. Wochenschr.*, *The Veterinary Journal*, December, 1896.

MANGE, SCAB, OR ITCH.

The history of this scabious disease dates as far back as 1300 years before the Christian era, but the accounts are so vague and ill-defined that their association with certain animals fails

to afford reliable data for scientific discrimination and treatment. The disease of one animal was frequently supposed to be communicable to others of a different genus, as from sheep to the horse. This does not agree with the investigations of the present day.

There are several kinds of these parasites, differing among themselves in size, shape and situation, viz: (1) The sarcoptes, which burrow into the skin. (2) The dermatodectes, which simply bite and hold on to the skin. (3) The symbiotes, which do not pierce farther than the cuticle.

The first of these, viz., the sarcoptes, are the most important, because they are deep-seated and cause the greatest irritation, and also the most difficult to kill, and being the most frequent transmitted to man. Horse, ox, dog, and cat are all liable to mange caused by the itch parasites, and they are very hard to distinguish except by differences in size in different animals. There are almost innumerable instances on record of the disease having been transmitted from animals to man. Students have not infrequently contracted the disease from dressing the skin of mangy dogs. The cat is frequently the subject of mange, as we very often see the hairs fall off the head and upper parts of the neck, and the disease is transmissible to many of the household family.—*The Veterinary Journal*, December, 1896.

TREATMENT OF ANASARCA BY THE SUBCUTANEOUS INJECTION OF ANTI-STREPTOCOCCUS SERUM (MARMOREK).

A recent communication from the Pasteur Institute, Paris, announces the important fact that anasarca in horses is due to a variety of the microbe known as streptococcus, and that the most rational as well as the most successful treatment for that condition is the hypodermic injection of the antistreptococcus serum (Marmorek). The communication referred to further says that by the intelligent employment of this remedy the microbes are quickly destroyed, resolution established, and all the symptoms materially modified. A few days only are required to bring about a noticeable improvement, such as progressive diminution of the swellings, disappearance of petechiæ and lowering of the temperature. The last named, however, is not of vital importance, as an elevation of temperature may

be due to some concurrent infection. The specific cause being removed, the after-treatment is very much simplified—judicious feeding and general tonics usually fulfilling all requirements.

The serum mentioned has already been extensively used in the human subject in the treatment of erysipelas, puerperal septicemia, etc., and with universal success. If it shall now prove to be a specific for equine anasarca as well, it must rank as one of the most valuable discoveries in the line of sero-therapeutics.

AN ENCYSTED HAIRY TUMOR IN A HORSE.

Surgeon Grams, of Rixdorf, near Berlin, writes to the *Berliner Thierärzt. Wochenschr.*, an account of a curious case that came under his notice. On examining an eight-year-old Belgian horse in fine condition, he found in the upper third of the shoulder region, about a hand-breadth behind the shoulder-blade, a small fluctuating swelling, which the owner of the horse attributed to the bite of a fly. Grams suspected pus in the swelling by reason of the fluctuation, and was going to puncture it at once with a pointed knife. But the swelling offered considerable resistance to the knife, a sign that the wall of the neoplasm was tolerably strong in its texture. Grams gave a short but firm push with his knife, and thereupon a quantity of greyish-black pus escaped which had no unpleasant smell. After splitting up with the bistoury, a fairly large ball of black hair was withdrawn from the swelling; this filled up nearly its whole cavity. As the swelling showed itself to be a completely encapsulated neoplasm in the subcutaneous and adipose tissues quite independent of the outer skin, Grams found it necessary, in order to avoid further gathering of pus, to extirpate the whole thing. It was then found that the swelling was of the bulk and shape of a hen's egg; it was five centimetres (two inches) long and three centimetres (one and one-fifth inches) broad. The tough, firm wall was one and a half millimetres (one sixteenth inch) in thickness; its inner surface was quite black in color, except that the lower end had a white point, and it was furnished with black hairs, some of them as long as one and one-fifth inches. The wound healed well and left but a small cicatrix.—*The Veterinary Journal*, December, 1896.

SUBCUTANEOUS ABSORPTION OF ALIMENTARY SUBSTANCES.

In all cases in which the taking of food in the natural way is impossible, or attended with danger to the patient, the custom hitherto has been to administer nourishment by means of clysters. It is quite possible in this way to introduce into the system all the nutritive materials necessary for the support of the body, but it is almost impossible to introduce the necessary quantities. In addition to this, we have the fact that food-clysters when frequently applied have the effect of irritating the rectum, whereby they come to be ejected after a very short stay in the intestines and so the chance of being absorbed is very much reduced. For a long time past, therefore, attempts have been made to introduce nourishment into the system subcutaneously, but, unfortunately, such attempts have, until quite recent times, shown no tangible results. Leube first succeeded, a short time ago, in introducing fat in the form of butter into a dog subcutaneously; he introduced a considerable quantity, (three pounds in six weeks), and so successfully that it was absorbed by the system. Leube was, however, unable to introduce sugar and albumen subcutaneously. Dr. Voit, experimenting solely on the human subject, has used only very thin solutions of grape-sugar, and has thus taken an opposite course to that of Leube. He has succeeded in injecting successive doses of a ten per cent. solution, beginning with ten cubic centimetres (about 2.5 drachms) and ending with 1,000 cubic centimetres (one quart) at one time without any bad effects. Sugar having thus been harmlessly injected into the body subcutaneously, the question arose whether it was not to be found immediately in the urine or whether it was really consumed. Experiments made with this object showed that of ten grammes of sugar injected no part was expelled in the urine, of sixty grammes no perceptible traces were found; only when 100 grammes were injected all at once did the urine show $2\frac{1}{2}$ per cent. of sugar. Now, 100 grammes (three ounces) of grape-sugar equal an addition of 410 calories, and therefore represents about the third of the caloric which a man in reduced bodily condition requires in a state of complete rest. It would thus be possible to reduce considerably the consumption of albumin by means of injections of grape-sugar.—*Münchener Med. Wochenschrift, The Veterinary Journal*, December, 1896.

THE INFLUENCE OF ODORS INHALED BY COWS UPON THE QUALITY OF THEIR MILK.

There is, perhaps, no fluid as susceptible to the action of odors as milk after it is drawn from the udder.

Coal-gas gives milk a very distinct odor; turpentine, a very strong odor; onions, very strong; tobacco smoke, very strong; musk, slight; paraffin oil, very strong; asafetida, very distinct; rotten fish, very offensive; camphor, moderate, etc. Samples of milk preserve their odor for four hours.

The conclusion is that milk, having such absorbent properties, should not be kept in the sick-room, and should not be used unboiled when it has been standing in a room in which there is a person suffering from a contagious disease.

It is well known that the food consumed by cows influences not only the composition of the milk but also its odor, taste, and at times its color. Besides, it is not often taken into consideration that the milk becomes altered in the udder when the cows inhale an atmosphere charged with certain odors or offensive gases.

Dr. Veith reports that a herd of twelve cows (American) for a certain time passed by the cadaver of a calf, and for a few minutes inhaled the surrounding air charged with putrefactive gases. This sufficed to contaminate not only the milk of these cows, but of eighty others with which these came into contact at the time of milking.

The milk became normal after the cadaver was buried.

In another instance, the milk of a herd of twenty-five cows emitted an intolerable odor; the carcass of a horse was found in a wood to which the animals had access. The cadaver was buried, and the odor of the milk disappeared.

When a stable is disinfected with phenic acid, milch cows or cattle that are to be slaughtered very shortly should not be introduced too soon. It has been found that the milk of such cows, which is consumed, boiled or unboiled, may produce in man nausea and even vomiting. Besides, the meat of such animals may possess a strong carbolic odor.

The purity of the air, its frequent renewal and great cleanliness are indispensable conditions for the production of good milk.—*Ann. de Med. Vet.*, November, 1896.

COMMUNICATION.

EDITOR OF THE VETERINARY MAGAZINE:

Will you kindly publish the following history of a case, that some of the older and more experienced practitioners may assist me in making a diagnosis?

The patient in question was a gray mare, fifteen hands high. The owner thought she had worms. A local druggist gave him eight powders, each of which contained fifteen grains of santonin, one dram of calomel and six minims of oil of worm-seed. The animal received one powder a day for six days, was driven on the seventh day. Owner reported that she did not seem as well as usual and was apparently unusually thirsty. On the eighth day she did not eat, seemed stupid and was taken with a profuse diarrhea which continued all that day and the following night. I was called in on the morning of the ninth day and found her lying with symptoms of abdominal pain. On compelling her to rise, I saw that she moved with some difficulty and seemed to be stiff all over. She was much excited, respiration quick and irregular, pulse rapid, soft and weak, temperature 103.4. There was a profuse, dark, watery discharge from the bowels every fifteen or twenty minutes. Upon leaving her she would immediately lie down and after turning her head nearly to her flank would stretch out on her side, extend her limbs and throw her head far back. These symptoms continued for three hours, when she died.

Post-mortem.—Lungs much congested and dark-colored; liver very dark; right kidney apparently normal; left kidney showed every appearance of acute nephritis. Heart seemed normal. There was a widespread emphysema of lungs, kidneys, heart, liver and peritoneum. The liver and lungs presented patches of emphysema six inches in diameter. The stomach and intestines were filled with a dark fluid having a very offensive odor. The mucous membrane of the small and large intestines was dark in color and covered with a thick layer of mucus. The fat in and about the abdominal muscles was unusually yellow and easily torn. I submitted a portion of all the organs, together with some of the contents of the

stomach and bladder, to a chemist and bacteriologist for examination, and append his report.

DR. JAMES McDONOUGH.

Montclair, N. J.

DR. JAMES McDONOUGH:

Dear Sir.—Reporting on the examination of the viscera which you submitted to me for examination, I beg to state that, after submitting the organs to the usual tests, I fail to find any trace of mineral poison of any kind. Under microscopic examination the kidneys showed marked structural change. The urine was impregnated with albumin, tubular casts were present in enormous numbers and cells from the deeper portions of the uriniferous tubules. The presence of urea in the liver and kidney in undue amount indicates uremia. In my opinion acute nephritis and uremic poisoning were present in this case.

Yours truly,

DAVID H. BALDWIN,

Chemist and Bacteriologist, Montclair, N. J.

PASTEUR MEMORIAL MONUMENT FUND.

FELLOW MEMBERS OF THE AMERICAN VETERINARY PROFESSION:

An opportunity has been kindly offered us by the Pasteur Monument Committee of France to contribute to the memorial fund which is now being raised. No one can appreciate more truly than the veterinarian how much Pasteur did for our profession and for humanity, and no other profession can feel a deeper interest in the success of the American subscription. Up to this time the veterinarians of our country have done nothing towards this object, because the subject has not been properly brought to their attention. I now appeal to every member of our profession to contribute something to this fund. Whether it be one dollar or ten dollars, it will testify to the sentiments of the giver and will assist in swelling the fund which we hope will creditably represent the great country in which we live. All contributions should be sent by draft or money order to Dr. E. A. de Schweinitz, Secretary Pasteur Monument Committee, Cosmos Club, Washington, D. C., who will duly receipt for the same. Will you not aid the Committee and sustain the reputation of our profession by acting promptly and liberally in this matter of international interest.

Washington, D. C., November 24, 1896.

D. E. SALMON.

Chairman Committee on Pasteur Memorial Fund of
United States Veterinary Medical Association.

PROCEEDINGS OF SOCIETIES.

NEW HAMPSHIRE VETERINARY ASSOCIATION.

The thirteenth meeting of the New Hampshire Veterinary Association was held at the Eagle Hotel, Concord, on Tuesday, December 8, at 11.30 p. m., with Dr. Lilico in the chair. Drs. Lilico, Tuttle, Hart, Abbott, Russell, Macguire, and Pope responded to roll call.

Dr. Pope read a report on the proceedings of the United States Veterinary Association's Convention at Buffalo, in September. Dr. Lilico, Chairman of the Legislative Committee, presented a proposed bill from the Committees to go before the coming legislature. The bill was discussed by sections, and a few changes suggested. Dr. Lilico was then authorized to employ counsel, and have the bill put into proper shape, and the penalties attached. After its completion the Secretary was instructed to call a meeting to reconsider the changes made.

A most interesting paper on "abortion" was read. Discussion followed.

Meeting adjourned until March.

L. POPE, JR., M. D. V.

Secretary.

MISSOURI VALLEY VETERINARY ASSOCIATION.

FORT LEAVENWORTH, KANSAS, December 12, 1896.

The eleventh regular meeting of the "Missouri Valley Veterinary Association," was held in Kansas City, Mo., Wednesday, December 9, 1896, in Room 23, Masonic Building. The meeting was called to order at 7.30 p. m., by President Stewart. The following members responded to roll call: Drs. Sihler, Barth, Stewart, Harrison, Black, Moore, Kaupp, Day, Hopkins, Bray and Hunter, Visitors: Drs. Shafter, Allen, Patten, Millness and Ovens, and Messrs. Freeman, Cooper, Conrad, Leper, Moore, Pouppirt, Wright, Simpson, and Cowden.

The minutes of the last meeting were read and approved.

A communication from Dr. N. S. Mayo was read, relating to "Cerebritis" in horses, caused by eating mouldy or wormy corn.

Dr. Shafter was elected to membership.

Excellent papers were read by Drs. C. J. Sihler and Benj. Kaupp, and were fully and freely discussed.

President Stewart interested the members in the parasite commonly called "Fluke," by a short talk, illustrating the subject with drawings and preserved specimens. After a most profitable time the meeting adjourned to meet in Kansas City, Mo., in February, 1897.

Essayists for next meeting, Drs. Barth, Shafter and Harrison.

S. L. HUNTER,

Secretary.

MONTREAL VETERINARY ASSOCIATION.

A meeting of the society was held on December 17, Professor Mills in the chair. Mr. Connelley reported a case of entropion of the lower eyelid of a fox-hound bitch. The eye presented a very unsightly appearance and the animal seemed to suffer a great deal of pain. At the request of the owner, Mr. Connelley decided to operate, which he did in the following manner: After removing the hair from the part, it was well washed with a boric acid solution and a 4 per cent solution of cocain injected. Mr. Connelley then removed an elliptical piece of skin from the lid and, drawing down the portion that was in contact with the eye, inserted three stitches, thus bringing the lid into its normal position. The wound was dressed with boric acid and iodoform, and in fifteen days had entirely healed. The bitch made an excellent recovery.

After complimenting Mr. Connelley upon the success of his operation, the chairman called upon Mr. Sugden for his paper on "Pneumonia." After describing the various forms of pneumonia and their pathologic appearances, the essayist reported a case which had recently occurred in the college practice and terminated fatally. A full report was given of the post-mortem appearance, which pointed to lobar pneumonia and acute septicemia, and of the bacteriologic examination, which revealed a general infection by strepto- and staphylococci. The essayist briefly referred to the work done by the Klemperer brothers on immunity from this disease, and in closing thanked Dr. Martin and Mr. Hammond (Pathologic Laboratory, McGill University), for the assistance they had so kindly rendered him.

After some discussion by the members on the subject of counter-irritation, Dr. Martin and Dr. Baker made some useful remarks upon the use of aconite in this disease.

Before closing, the chairman briefly referred to his experience in pneumonia in dogs.

MONTREAL VETERINARY ASSOCIATION.

The regular meeting of the Society was held on the evening of November 19, in the Library of the College. Vice-President Dr. Charles McEachran occupied the chair. There being no business the chairman called upon Mr. Newcomb to report his case. This was one of supernumerary testicles in the horse. Interesting from its rarity and the denial of its occurrence by several authors who consider mistaken diagnosis responsible for such cases, Mr. Newcomb, confident of a correct diagnosis, had no hesitation in reporting the following cases:

"On June 16, 1895, I was called to castrate a well-bred two-year-old. On examination no sign of scrotal hernia was discovered, but quite a difference in the size of the testicles was noticeable, the left being one and a half times the size of the right. The colt was cast and the right testicle removed. The left side of the scrotum was then incised and, to my surprise, the testicle exposed was no larger than the first; a little traction made the cause of the variation in size apparent. The spermatic cord was divided and on the branch was a third testicle which did not differ from the other except in size; it possessed an epididymis and, as far as the naked eye could discern, had the same structure. The ercaseur chain was passed over the cord above the division and both testicles removed.

"In May, 1896, I received a letter from the owner asking me to examine the same colt. Dr. E. H. Morris and myself examined the animal and found the right side of the scrotum enlarged and containing what we had no doubt was a testicle, although it seemed firmly adherent to the walls of the scrotum. On the nineteenth of May we operated and removed another testicle. The covering was inseparable and it was necessary to dissect the testicle away from the scrotum. The cord was thickened and very tough, and after breaking an ecraseur chain the emasculator was used to sever it. The wound healed splendidly and the animal caused no further inconvenience to the owner."

Mr. Cullen followed with a paper on horseshoeing. The essayist after describing the provisions of nature for maintaining the foot in a normal condition while the animal is in its natural state, i. e.: on the plains, remarked that in his opinion, owing to these provisions being absent in its domesticated condition, careful attention to the feet from birth was indicated. Practical shoeing for the different breeds of horses for the various work required of them was fully discussed. The essayist remarked that in his experience it was seldom that a normal foot appeared at the forge, owing to the lack of aforesaid attention; consequently he would devote the greater part of his essay to the shoeing of abnormal feet.

After condemning the various forms of careless and ignorant shoeing, he clearly indicated the methods that might be employed for their correction. He described many points of practical interest in the application of shoes for relieving the lameness consequent upon such diseases as corns, cracks, etc., showing the difficulty under which the horseshoer labored in being frequently required to apply a shoe for the immediate cure of lameness, even after pointing out to the customer the necessity of prolonged treatment and rest.

The main points of interest in this discussion appeared to be (1) The permanent use of the bar shoe for the production of the necessary pressure on the foot-pad. (2) The query as to whether the application of a hot shoe to obtain a level bearing was injurious or not, the essayist upholding the judicious practice of this method for that purpose.

Dr. Charles McEachran, after complimenting the society on the spirited manner in which the discussion had been maintained, and the essayist on the able way in which he had defended his paper, stated that in his opinion, although the bar shoe was undoubtedly often necessary, a slight pressure exerted between the ground and the foot-pad by an open shoe conforming to the natural shape of the foot was preferable.

B. A. SUGDEN, *Secretary and Treasurer.*

A meeting of the Society was held on the evening of December 3, 1896, in the library of the College, the president, Dr. Baker, occupying the chair.

Mr. Parker reported an interesting case of esophagotomy in the cow. Before Mr. Parker arrived at the case, the owner and friends had attempted to remove the obstruction, which eventually proved to be a large potato, by pushing it down with a fork handle. On Mr. Parker's arrival he found the animal in a condition of extreme tympanites, which he relieved by using the trocar. Being unsuccessful in his efforts to remove the obstruction by means of the probang, he decided to

operate. This was done under strict antiseptic precautions, the animal making a good recovery in twenty-eight days, during which time the patient was supported by rectal injections of new milk, slowly administered, and by drenches of oatmeal gruel.

Some discussion followed as to the various methods of treating these obstructions, and it was suggested that in cases similar to the above the animal might be supported by direct injection into the rumen.

Mr. Hilliard read a paper on "laminitis," which he commenced by pointing out that the term "Founder" was based on the assumption that an animal so affected was unable to progress favorably, and thus resembled a ship when disabled. Among predisposing causes he cited that of crossing light and heavy breeds, a frequent result of which is an animal with feet too light to support a heavy body. Mr. Hilliard then discussed the various methods of treatment, and in concluding advocated the application of a stout wide-webbed barshoe.

The relative value of hot and cold applications was discussed by the members, the majority being in favor of the latter.

The president then briefly gave the history of some cases of laminitis which had occurred in his own practice. His experience had shown him that for treatment to be successful it is essential that it be resorted to early. He had had equally good results from both hot and cold applications. If the animal be bled, it should be done early, and the blood rapidly extracted. He advised the members, when called upon to see a horse taken suddenly ill and breathing rapidly, always to have it moved before making a diagnosis.

The Secretary read a communication from Dr. Rowat, of Hawaii, with regard to a disease which had recently made its appearance in a herd of cattle, and which he designated "Enzootic Hematuria." This was listened to with much interest, and at the conclusion a vote of thanks was unanimously accorded to Dr. Rowat.

B. A. SUGDEN,

Secretary and Treasurer.

VETERINARY ASSOCIATION OF NEW YORK COUNTY.

The regular monthly meeting, December 2, 1896, of the Veterinary Association of New York County, was called to order at 8.45 p. m., at the Academy of Medicine, with the president, Dr. Huidekoper, in the chair.

On roll call the following members responded: Drs. Amling, C. C. Cattanach, J. J. Cattanach, J. S. Cattanach, J. S. Cattanach, Jr., Delaney, Ellis, Farley, Giffen, Gill, Huidekoper, Hauson, Loomes, Machan, MacKellar, Neher, O'Shea and Ryder (18).

Report of Board of Censors.—Dr. Gill, chairman, reported favorably for membership in the Association on the following gentlemen: Dr. Roscoe R. Bell, of Brooklyn, and Dr. F. E. Winslow, of Flushing, N. Y. Dr. Frank E. Miller, of New York, was referred to the meeting as a worthy applicant, but not registered in the county. Moved and seconded that the report of the Board of Censors be accepted. Carried. On vote, all three gentlemen were made members of the Association.

Judiciary Committee.—Dr. O'Shea, chairman, reported that through our counsel, Messrs. Van Schaick and Norton, a prosecution had been made in the case of one N. S. Bryant, a "quack" from Kansas, who had issued circulars advertising himself as a "doctor," "veterinary dentist" and "specialist," and had been doing work in various parts of New York. After arrest of said Bryant, the case was heard by Judge Cornell at the Yorkville Court, and after postponement, at the Harlem Court, said Bryant was put under \$300 bond, and case finally disposed of in Special Sessions, with conviction. Moved and seconded that the report be accepted. Carried.

The Chair reported that lists of the registered veterinarians of New York and Kings County had been obtained, and suggested that, as the publication of this list would entail a considerable expense, it might be advisable to extend the publication still further by adding the following information :

In preparation, "Veterinary Blue Book of New York," 1897, by authority of the Veterinary Medical Association of New York County (Incorporated).

Officers: President, R. S. Huidekoper, 154 East Fifty-seventh street; Vice-President, James L. Robertson, 409 Ninth avenue; Treasurer, C. C. Cattanach, 15 West Forty-fourth street; Secretary, Robert W. Ellis, 531 West One-hundred and Fifty-second street; Counsel, Van Schaick & Norton, 96 Broadway.

Contents:—The New York State Law Regulating Veterinary Practice.

A Register of Licensed Veterinarians in New York, Kings, Queens and Westchester counties.

The Veterinarians officially employed in New York County and vicinity: By the Treasury Department, United States Government; by the Bureau of Animal Industry, United States Department of Agriculture; by the City Departments, New York City; by the Society for the Prevention of Cruelty to Animals, etc.

The Licensed Veterinarians in New York State who are members of the New York State Veterinary Medical Society.

The Officers of the: United States Veterinary Medical Association, New York State Veterinary Medical Society (Incorporated), Veterinary Medical Association of New York County (Incorporated).

The Officers and Faculties of the Veterinary Colleges:—New York College of Veterinary Surgeons, New York City; American Veterinary College, New York City; The New York State Veterinary College at Cornell University.

A Digest of United States, New York State and New York City Laws regulating:—Glanders and Contagious Diseases in Animals, Inspection of Meat and Milk, Removal of Dead Animals, Licensing of Dogs, Auction Sale of Horses, Cabs and Cab Service, New York City; Importation and Exportation of Animals—Interstate, to Canada, and to England, France and other foreign countries.

Regulations concerning Transportation of Animals by Steamship and Railway, and by Express Companies from New York City.

Insurance of Live Stock in transport, and from fire.

Information concerning, and List of Officers of:—The Jockey Club, The Coney Island Jockey Club, The Brooklyn Jockey Club, The Westchester Racing Association, The National Hunt Association, The Polo Clubs, The National Trotting Association, The Master Horseshoers' Association, The Bookmakers' Association, The American Kennel Club, The Westminster Kennel Club, The

Metropolitan Kennel Club, The National Horse Show Association, The National Live Stock Association, The American Cat Club, etc., etc.

Advertisements:—A limited number of Advertisements, subject to approval, will be taken from:—Veterinary Colleges, Veterinary Hospitals and Infirmarys, auction marts for sale of horses, dealers in horses, dealers in harness, dealers in wagons, dealers in stable supplies, Custom House brokers and commission brokers who attend to receiving and shipping horses, ocean steamship lines—transportation of horses and cattle, insurance—live stock in transport by railroad and steamship, insurance—live stock from fire, Veterinary instrument makers and supplies, Veterinary and sporting book dealers, Veterinary drugs, dealers in mallein, tuberculin, antitetanin, etc.

Address all communications to

DR. HUIDEKOPER,
154 East Fifty-seventh street, New York City.

The Chair believes that subscriptions and advertisements to this publication would at least pay for it, and would probably bring in a profit. Moved and seconded, that the report be accepted, and the matter placed in the hands of a committee of three for publication. Carried.

Election of Officers for Ensuing Year.—Nomination for president: Nomination of Dr. Huidekoper; moved and seconded that the nominations close. Carried. For vice-president: Nomination of Drs. Robertson and Ryder; moved and seconded that the nominations close. Carried. For secretary: nomination of Dr. Ellis; moved and seconded that the nominations close. Carried. For treasurer: Nomination of Dr. C. C. Cattnach; moved and seconded that the nominations close. Carried. As there was but one nomination for president, secretary and treasurer, it was moved and seconded that the by-laws be suspended, and vote by acclamation for these offices. Carried. Ballot was next cast for vice-president, as follows: Dr. Robertson received thirteen and Dr. Ryder five votes. Moved and seconded that the election be declared unanimous for Dr. Robertson. Carried.

According to a motion passed at the November meeting, a list of all members eighteen months in arrears was taken up for action, and disposed of in accordance with Article XII of the by-laws.

A communication was then read from an expelled member of the association, and referred to the Board of Censors to report on at the next meeting.

The president appointed the following committees for the ensuing year, the officers being *ex-officio* members of each:

Board of Censors.—H. D. Gill (chairman), J. E. Ryder, H. D. Hanson, J. S. Cattnach, R. R. Bell.

Judiciary Committee.—Arthur O'Shea (chairman), Hanson, Jackson.

Publication Committee.—H. D. Gill (chairman), J. E. Ryder, T. Delaney.

Moved and seconded that the meeting adjourn. Carried.

ROBERT W. ELLIS,
Secretary.



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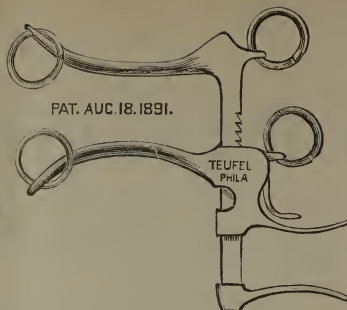
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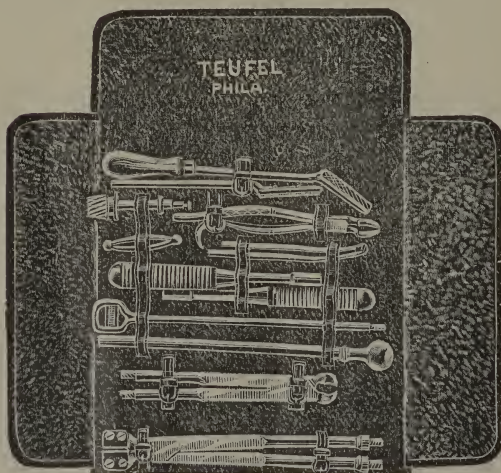
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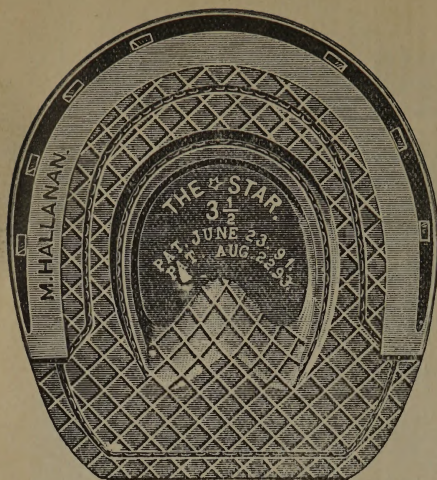
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